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ABSTRACT

The growth in enrollments of hearing-impaired students at colleges and universities indicates that the issue of accessibility is being addressed; however, it is not clear whether institutions have made adequate accommodations to meet the communicative and educational handicaps imposed by severe to profound hearing impairment. A survey was conducted of 95 programs serving hearing-impaired persons at the postsecondary level, to gather data on enrollment figures, graduation figures, and related information; and an algorithm was derived to estimate cohort survival rates. Attrition rates for deaf students were lowest for the group of postsecondary programs primarily offering diplomas and highest for those offering associate degrees. Overall, the attrition rate was estimated to be about 70 percent of an entering class of hearing-impaired students, which was an average of one-third higher than rates reported for a comparable group of hearing students. Social and educational isolation, or lack of integration into the educational community, is suggested as a cause of the high level of attrition of deaf college students. (Author/JDD)

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Attrition Among Hearing-Impaired College Students in the U.S.

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ABSTRACT

The numbers of hearing-impaired persons attending colleges and universities in the United States has increased tremendously since the end of World War Two. This growth is evidence of the increased accessibility hearing-impaired persons have to colleges. However, the results of this study suggest that accommodations to meet the special needs of hearing-impaired learners may not be adequate to insure their graduation from college. Estimates of attrition rates range from 60 to 80 percent, depending on the degree being sought and the type of institution. When compared with known attrition rates of hearing college students, these figures are significantly higher. The paper suggests that a reason for the high rate may be a lack of social and academic integration of the hearing-impaired student into college life.

INTRODUCTION

Efforts to provide access and choice in higher education since the end of World War II have markedly influenced the numbers of severe to profoundly hearing-impaired persons seeking admission to and being accepted at post-secondary educational institutions. It is estimated that there were about 200 students registered in 1945, and over 40 years the numbers grew to over 7,000.[1] The growth during this time was the result of the baby boom after World War II, changes in societal attitudes toward providing educational opportunities to people with disabilities, and at least two significant rubella epidemics during the same time.[2]

As the 1990's approach, the rate of growth is expected to decrease. However, the need for postsecondary educational programs for hearing-impaired people will not lessen, since the United States is moving from a "manufacturing" to an "information" based economy. Technicians; professionals in business, industry, health, and education; engineers; and supervisory personnel will continue to be in demand. Educators, therefore, will need to insure that hearing-impaired individuals not only gain access to postsecondary education but also realize their potential to benefit from available learning experiences provided by educational institutions.

The growth in enrollments of hearing-impaired students at colleges and universities indicates clearly that the issue of access is being addressed. However, it is not at all clear whether institutions have made adequate accommodations to meet the communicative and educational handicaps imposed by severe to profound hearing impairment. These authors, therefore, developed an indirect method for analyzing how well colleges and universities who admit hearing-impaired persons are accommodating these students. The authors hypothesized that sufficient accommodation to the special needs of hearing-impaired college students would result in rates of

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[1] *These estimates are derived from figures reported by Bigman (1961), Schein and Bushnaq (1962), Breunig (1965), Quigley, Jenne & Phillips (1968); Kerstetter (1985); Rawlings & King (1986).*

[2] *The epidemics occurred in 1957-59 and 1963-64. It is estimated that the 1963-64 epidemic resulted in more than 8,000 additional births of people with congenital hearing-impairments.*

withdrawal from college that are comparable to the rates for their hearing peers. In this sense, rate of withdrawal can be used as an index of accommodations being made to the special needs of hearing-impaired college students.

METHOD

Sources of Data

The data used for this study are from a survey of postsecondary programs for hearing-impaired students in North America conducted in the fall of 1985 by Gallaudet University and the National Technical Institute for the Deaf at the Rochester Institute of Technology (Rawlings, et al., 1986). Each college, university, or technical school known to have a specially designated program for hearing-impaired students was contacted and asked to complete a questionnaire. The questionnaire collected information about the program, the date the program was established, the accreditation of the program, special support services offered, size of hearing-impaired enrollments, total enrollment of the institution, number of graduates from the program, admission requirements, and majors of hearing-impaired students. Information was obtained from 145 programs serving hearing-impaired persons at the postsecondary level. The responding institutions represent a total enrollment of 7,031 hearing-impaired students (5,917 full time and 1,114 part time) in colleges and universities in the U.S. and Canada. Thirty-four states, the District of Columbia, and Canada are represented by the responding programs.

Analyses

The data in Table 1 are average enrollment figures for 95[3] of the 145 institutions surveyed in 1985 for the book *College and Career Programs for Deaf Students*. For this study, programs were categorized by the type of degree most often granted in 1985. Thus, if a program granted both Diploma

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[3]*Only programs established in 1980 or earlier were included in the analysis in order to provide stability of enrollment and graduation levels which might be variable in a newly-established program.*

and Associate degrees in 1985 but granted more Diplomas than Associate degrees, that program is categorized as a Diploma granting institution for purposes of this analysis. The graduates are defined as the reported number of Diploma/Certificates, Associate, and Bachelor degrees granted in 1985. Overall, while the average size of the 95 programs reported in Table 1 is 62.1 students,[4] these same programs graduated an average of only 7.1 students in 1985. This is a rather low rate of graduation, given the average size of enrollments, and is what initially led these investigators to develop the model of cohort survival described below.

Attrition is best evaluated by a method called cohort survival (Lyell and Toole, 1974). In this technique, a group of students entering an institution for the first time are tracked, and the survival rate to graduation for some given point in time after entering the institution is calculated. For Bachelor degrees five years is the time most often used when calculating attrition rates, since four years is generally a minimal amount of time to receive a degree. For two year institutions, three years is often used as the point in time to calculate rates of attrition.

Ideally, knowing the cohort survival rates for the colleges represented in the book *College and Career Programs for Deaf Students* (Rawlings, et al., 1986) would be the best way to measure attrition. Since such information is not reported, a model of cohort survival utilizing the data reported by the schools for the 1985 survey (Table 1) has been developed. Since the survey reports numbers of students enrolled in the preparatory through senior classes of undergraduate programs and the number of students graduating with a Diploma/Certificate, Associate, or Bachelor degree in 1985, an algorithm to estimate cohort survival rates can be derived for aggregate data.

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[4]*These figures included the large federally supported programs of Gallaudet University and the National Technical Institute for the Deaf at the Rochester Institute of Technology.*

Table 1. **Mean enrollment statistics by type of degree most often granted for postsecondary programs for the deaf in the U.S.--1985 data.**

DEGREE TYPE	NUMBER OF PROGRAMS	AVERAGE NUMBER OF STUDENTS					AVERAGE NUMBER OF UNDERGRAD	AVERAGE NUMBER GRADUATING
		PREP	FRESH	SOPH	JUNIOR	SENIOR		
Diploma	46	14.2	20.5	19.2	2.0	2.9	58.8	8.7
Associate	27	15.9	16.7	11.4	.4	.4	44.8	3.8
Bachelor	22	13.3	40.1	13.3	11.7	10.3	88.7	7.8
TOTAL	95	14.5	24.1	15.6	3.9	4.0	62.1	7.1

The Model

In order to approximate a cohort survival model, it is important to know the numbers of first year (new) students entering the educational system each year. Since these data were not available from the questionnaire, the data in Table 1 were transformed to estimate the number of newly admitted students.

Estimates for the numbers of new students (Table 2) were calculated in the following way: the assumption was made that institutions admit new students to both the preparatory and freshman classes, but that across all institutions some students in the freshman classes are actually in their second year of attendance and thus not new students. This assumption is based on experience from Gallaudet University and the National Technical Institute for the Deaf that about sixty percent of preparatory students continue to become freshmen. If this is the case then, for example, of the 24 freshmen reported for all programs in Table 1, eight (60% of 14.5) would be second year students and not new. Thus, the estimated number of new students in the preparatory and freshman classes would be given by the equation:

$$\text{New Students} = \text{Prep} + (\text{Freshman} - (\text{Prep} \times .60)).$$

Table 2 contains the estimated number of new students for each of the program types using the equation above.

Using the cohort survival model, attrition rate can be derived by application of the equation below:

$$\text{Attrition} = 1 - (\text{GRADUATES}/(\text{FIRST YEAR}))$$

Applying this equation to programs educating deaf youth, however, will yield a rate of attrition that is inflated. This is because the number of

Table 2. Enrollment rates by year of attendance for postsecondary programs for the deaf in the U.S.--1985 data.

PROGRAM TYPE	AVERAGE NUMBER OF UNDERGRADUATES	ESTIMATED NEW STUDENTS	AVERAGE NUMBER OF GRADUATES
DIPLOMA	58.8	26.2	8.7
ASSOCIATE	44.8	23.1	3.8
BACHELOR	88.7	45.4	7.8
TOTAL	62.1	29.9	7.1

persons graduating in 1985 entered, for the most part, before the increase in enrollments due to the rubella epidemic. To be accurate, the graduates of 1985 must be compared with a cohort size entering five years ago. That is, the graduates of 1985 must be divided in the equation by the number of first-year students in 1980. It has been estimated that the number of first-year students in 1980 (a pre-rubella year) would be 20 to 40 percent less than in the rubella years (Stuckless and Walter, 1983.) Using this assumption, it is necessary to reduce the number of first-year students in the equation to reflect the probable size of the cohort entering in 1980. In effect such an adjustment would reduce the attrition rate for programs that have not shown an increase in students because of rubella and thus make the model more conservative. Since the effect of rubella on enrollments in all postsecondary programs is not exactly known, the results section will estimate attrition (Table 3), using three assumptions: 0 increase due to rubella, 20% increase due to rubella, and 40% increase due to rubella.[5]

[5]*To test the validity of the model, the number of new students entering NTID in 1985 and the number graduating were entered into the equation. With no adjustment for rubella, attrition rate was estimated to be 55%, with the 20% adjustment it is 46%, and with the 40% adjustment it is 27%. At the time of this writing 43% of the 1980 new students at NTID had actually withdrawn, 55% had graduated, and 3% were still enrolled. Since it is known that rubella caused an enrollment increase of approxiately 20% in new admissions in 1985, this single case supports the validity of the model when the 20% adjustment is used.*

Results

Table 3 contains the resultant attrition estimates using the three assumptions presented above. It can be observed that estimated attrition rates are lowest for the group of programs primarily offering Diplomas and highest for those offering Associate degrees. Under the assumption of an increase of 20% in student numbers due to the rubella epidemic, about 59% of students entering programs offering primarily Diplomas will withdraw, while the estimate is 79% for the programs offering primarily Associate degrees.

Table 3. Estimated attrition rates for 95 postsecondary programs for the deaf by type of degree granted most often in 1985 using three assumptions about changes in numbers of new students.

DEGREE TYPE	ATTRITION RATES CHANGE IN NEW STUDENT NUMBERS		
	0%	20%	40%
DIPLOMA	67	59	45
ASSOCIATE	84	79	73
BACHELOR	83	79	71
OVERALL	76	70	61

Overall, depending on the assumption being made about the growth in numbers due to rubella, the estimated attrition rate is probably about 70 percent of an entering class of hearing-impaired students. While these figures appear to be high, they must be compared to similar figures for hearing students. Data are summarized in Table 4 from a national study of student attrition by Beal and Noel (1980). It can be observed that even for hearing college students there is considerable discrepancy in attrition rates among different types of schools. However, using even the most conservative assumption of a 40% increase in the size of the population entering college as a result of the rubella epidemic, the estimated rates for students at programs for the hearing-impaired far exceed the national rates for hearing students.

Table 4. Student attrition rates in various types of U.S. colleges with open or liberal admission standards (Beal and Noel, 1980)

TYPE OF COLLEGE	ATTRITION (AFTER FIVE YEARS)
PRIVATE TWO YEAR	39%
PUBLIC TWO YEAR	58%
PRIVATE FOUR YEAR	43%
PUBLIC FOUR YEAR	48%

DISCUSSION

The results of this analysis must be interpreted with caution, since there were two transformations needed in order to estimate the attrition rates. In each instance a transformation was made, the reader will note that the effect was to reduce the calculated rate of attrition for hearing-impaired students. Even so, the rate of attrition is, on the average, one third higher than the rates reported for a comparable group of hearing students.

These results lead one to ask whether the rates of attrition for hearing-impaired students in postsecondary education programs are acceptable. These authors suggest that the rates defined in this study must be substantiated through actual cohort survival analyses. If the results from such a study support the current findings, then two questions must be posed: why are the rates so high, and what can be done to reduce these rates of attrition? While it is beyond the scope of this paper to provide answers for these questions, the literature on attrition suggests a way of exploring these questions.

The theoretical model presented by Spady (1970), elaborated by Tinto (1975), and tested in various environments by Pascarella and Terenzini (Pascarella & Terenzini, 1979, 1980; Pascarella & Chapman, 1983; Theophilides, Terenzini & Lorang, 1984) provides an explanatory predictive theory of the persistence/withdrawal process that can be applied for use with deaf college students. The theory posited by Tinto (1975) is longitudinal and considers persistence, primarily, a function of the quality of a student's

interactions with the academic and social systems of an institution. That is, students come to a particular institution with a range of background traits (e.g., achievement, communication, gender, social economic status, personality traits). These background traits influence not only how the student will perform in college, but also how he/she will interact with, and subsequently become integrated into, an institution's social and academic systems. Other things being equal, the greater the student's level of social and academic integration, the more likely he or she is to continue at the particular institution.

For hearing-impaired students entering college, there are a number of variables which may mitigate against their integration into these social and academic systems--most notably their communication and academic skills--especially in the areas of math, science, and reading.[6] Difficulties in these areas reduce a deaf person's ability to use traditional avenues of information transfer in college. While most programs surveyed in this study provide support services of interpreting and notetaking, these services, by themselves, may not necessarily improve the ability of hearing-impaired students to understand the content of a textbook or a lecture. The provision of lecture notes or sign language interpretation for lectures does not necessarily mean that the "achievement barrier" created by low reading and mathematics skills has been breached. It may be necessary to modify texts and instructional materials and provide a comprehensive battery of compensatory and remedial programs to accommodate the needs of hearing-impaired deaf students.

In a similar fashion, the communication problems experienced by most hearing-impaired persons make it extremely difficult for them to take part in the usual social activities of campus life. Therefore, even though a hearing-impaired person has access to college, he/she may remain isolated both socially and educationally from the mainstream. Such isolation, or lack of integration into the educational community, may be a cause of the high level of attrition of deaf persons attending college.

[6]*For example, the median reading grade equivalent for 17 year old hearing-impaired students is 3.2 on the Stanford Achievement Test (Allen, 1986).*

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